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# Modeling Climate Change Impact for the PEINP Forest

The forest of Prince Edward Island National Park (PEINP) is currently highly degraded, further exacerbating the inherent climatic vulnerability of the Acadian Forest Region (AFR). Forest modeling will be used to characterize these vulnerabilities and assess proactive management under climate change.

iLand will be used for the first time in the AFR for this project. It offers a novel approach for assessing the feedback between individuals (trees) and their environment (ecosystem processes, climate and disturbance) in a scalable manner. PEINP is an ideal landscape for initial application of this model because the small size of the land base and high intensity forest inventory provides a wealth of information for initialization and calibration purposes. The Park is also representative of the heavily disturbed forest found in much of the AFR and will provide a framework for future studies to be conducted throughout the region using iLand.

The current forest is >50% old-field white spruce (OFWS), with the remaining area comprised of mixed-wood and intolerant hardwood stands. Many OFWS stands are nearing collapse and are extremely vulnerable wind disturbance. The management goals for PEINP include restoring the AFR composition and reducing the impact of climate change on the ecological and social function of the forest.



Blowdown in a PEINP white spruce stand after post-tropical storm Dorian in 2019 (S.Willis)

## Objective #1

- Calibration of the iLand forest model for use with AFR species at the species, community, and landscape level. When calibration is achieved, the model will be initialized using the stand inventory data from the PEINP 2015 management plan and run under current, moderate, and high climate forcing scenarios

## Objective #2

- Implementation of management scenarios based on current Park objective of restoring the AFR condition and suggested strategies to combat climate change (increased diversity, reduction in white spruce/balsam fir component, etc.)

We expect to find that the current condition of the forest is extremely vulnerable to significant collapse under climate change with poor regeneration prospects due to lack of available seed source. We project that management to increase diversity, reduce old field white spruce presence, and increase tolerant hardwood species will help to protect the ecological and social value of the park. Currently, single-species calibration is underway. The proposal presentation is planned for April 2021 with expected completion of the project for August 2022.

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